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NPIC/TDS/D-834-67
24 May 1967

MEMORANDUM FOR THE RECORD

SUBJECT: Human Factors Liaison II

1. The purpose of this memorandum is to supplement the previous memorandum submitted for the record reporting liaison accomplished in support of the NPIC Human Factors contract with the [redacted] The previous documentation reported visits of a technical nature made between October 1966 and February 1967. The present report will deal both with technical consultation and with administrative liaison accomplished both in and out of the Washington area. 25X1

25X1 2. As reported in less detail elsewhere, considerable consultation has been accomplished between NPIC human factors research monitors and Dr. [redacted] and part time a
25X1 consultant [redacted] is one 25X1
of the country's most prominent specialists in visual perception and perceptual learning. He has published widely on his research findings in many psychological journals. Additionally, his consultantship with [redacted] has 25X1
brought him into intimate contact with many disciplines relevant to imagery interpretation. His specific task being performed in conjunction with [redacted] 25X1
is one which involves a fresh look at the image interpreter function from the point of view of the science of visual perception. Although a formal contractual arrangement has not yet been finalized between TDS and [redacted] 25X1
he has contributed many valuable hours of donated consultation time in connection with our Human Factors contract. His expertise has proven especially
25X1 valuable in connection with [redacted] tasks involving investigations of lighting characteristics as they influence interpreter performance and also in connection with a task involving the assessment of various human visual mechanisms
25X1 as they affect interpreter output. [redacted] personnel have consulted directly
25X1 with [redacted] and via the telephone. His primary interaction, however, has been with Technical Development Staff personnel both via the telephone and during personal visits to NPIC. His fully cleared, blue-badge

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25X1 status has permitted [redacted] to be in a unique position from which to compare Center problems as they correspond or conflict with Department of Defense problems in image interpretation, with which he has had contact 25X1 through the [redacted] In general, he has reaffirmed our position that, in fact, the Center's interpretation environment is significantly different from those encountered in tactical situations such as those with which the Army has dealt in numerous interpretation 25X1 studies. One of [redacted] most significant conclusions regarding the optimization of interpretation has been that perceptual training may be the most fruitful route toward sizable image interpreter performance improvement. The implementation of such a conclusion, if borne out under future scrutiny, would be both economical and easily achieved. Numerous other psychologists and educators familiar with our major problems at NPIC have arrived at similar conclusions; that is, that within the training field probably lie the most productive resources with which to solve our most critical problems. Preparations for procuring formally the consulting 25X1 services of [redacted] are currently underway with NPIC approval channels. It is hoped that he will be officially available to TDS by the beginning of Fiscal 1968.

3. The original auspices under which [redacted] came to the attention of the Technical Development Staff was through the Office of the Assistant Director of Intelligence and Reconnaissance of the Defense Department's Deputy Directorate for Research and Engineering (DDR&E), [redacted] 25X1 and his assistant [redacted] It is from this office that the majority of image interpretation research within all branches of the Department of 25X1 Defense is controlled. Both [redacted] are intimately familiar with NPIC operations as well as with the broad scope of DOD interpretation operations. They have expressed on numerous occasions the desire for close cooperation between NPIC authorities responsible for interpretation research and those analogous officials within DOD. The area of Human factors, especially, has been pin-pointed as one which is in need of urgent coordination. It has been with this goal in mind that DDR&E has authorized the time of [redacted] of the [redacted] to con- 25X1 25X1 sult with the Technical Development Staff regarding our major Human Factors 25X1 effort. [redacted] is one of the most prominent human factors scientists in the country. He has had many years of professional experience both in 25X1 industry, when he was with [redacted] and also with [redacted] in close 25X1

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association with the Department of Defense. He is currently in the final stages of blue-badge clearance processing. It is hoped that his expert advise will become available to TDS within the near future on a regular basis.

4. As briefly referred to in the previous memorandum, liaison has been continually maintained with the Human Factors capability at the Rome Air Development Center in the person of [redacted] 25X1 is not currently blue-badge cleared but has been conducting several significant human factors efforts in support of Air Force tactical imagery interpretation. He has been designated by the Air Training Command Headquarters at Lowry Air Force Base as the chief scientist responsible for conducting 25X1 Air Force image interpreter training research. Particularly relevant efforts 25X1 initiated by [redacted] have involved the formulation of programmed instruc- 25X1 tion for teaching interpreters the fundamental techniques involved in the evaluation of records derived from [redacted] sensors. 25X1 25X1 An [redacted] package has already been completed for RADC by [redacted] 25X1 [redacted] he development of a [redacted] instructional package is 25X1 25X1 soon to be initiated by [redacted] primarily at their [redacted] facility. Another of [redacted] projects extremely relevant to 25X1 NPIC's operations is a project being conducted by the [redacted] 25X1 [redacted] involving the use of carefully-controlled photographic chips known as 25X1 "GEMS" for the assessment of how interpretability of missile site intelligence varies as a function of resolution and contrast. This effort is similar to one conducted by [redacted] 25X1 [redacted] for the Technical Development Staff last year. Our sponsored study, 25X1 however, was more carefully controlled in terms of objective performance measurement in that final interpreter output was assessed by Agency intelligence analysts. The criteria used by RADC for evaluating interpreter output have been purely subjective and thus somewhat subject to doubt. [redacted] 25X1 has expressed his regrets at not being able to conduct his study in the care- 25X1 fully controlled manner which we were fortunate enough to have available. 25X1 An additional contract of significant interest to NPIC is one entitled "Multi- Sensor Interpretation Training" which [redacted] is running currently with [redacted] This research program 25X1 has just recently begun but promises to have much in common with [redacted] 25X1 [redacted] and its training subtasks subcontracted to [redacted] Other extremely relevant although 25X1 not wholly applicable studies conducted through RADC have included color versus black-and-white imagery interpretation assessment and stereo versus monoscopic viewing efforts. It is hoped that [redacted] imminent clearance 25X1 into the T-KH System will further enhance liaison between RADC and NPIC regarding research of mutual interest.

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5. On 30 March 1967, the Naval Ordnance Test Station at China Lake, Calif. was visited regarding human factors research ongoing there as applied to the field of ground to air target acquisition and recognition in a direct visual reconnaissance environment. [redacted] of the Aviation Ordnance Department was contacted. One of [redacted] primary activities of interest to NPIC has been his consultantship to Joint Task Force II, a large target acquisition study being conducted at the [redacted] for the Joint Chiefs of Staff. Under JTF II, Sub-Task 4.4 concerning non-briefing search for military targets (otherwise known as targets of opportunity), objective B is "to measure the relative information collection capability of visually-acquired and voice reported (real-time and post flight debriefing) reconnaissance information and sensor-acquired information requiring processing and interpretation (photography, [redacted] in terms of: 1) quantity of information as compared to ground truth. 2) quality of information as compared to ground truth. 3) accuracy of information as compared to ground truth. 4) timeliness of information." In addition to NOTS support for JTF II, contributions are also coming from [redacted] is also involved in several independent endeavors of extreme relevance to NPIC interests. Among others, his investigations of visual search performance as a function of peripheral visual acuity is most apropos. Two very significant findings to date concerning peripheral acuity have shown it to be directly correlated with visual search performance and also to be trainable over time. An additional discovery by [redacted] during the course of his work has been that operator smoking is negatively correlated with search time. This phenomenon, however, has not yet been confirmed in a controlled experiment either at NOTS or at [redacted] where it has also been preliminarily identified. Another relevant interest of [redacted] is one which he shares with the Human Factors Engineering Branch at the Naval Missile Center at Pt. Mugu, California and concerns video target detection. The extraction of target signals from video display noise is a potential area of concern for many military operations including reconnaissance interpretation. [redacted] although not a psychologist by background, has become heavily involved in the fields of human factors and visual perception as related to his duties with the Navy. Another interest of his in common with those of TDS & NPIC is in the use of terrain models. The NOTS application is somewhat different from ours in

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that the interest there is in target acquisition characteristics as they influence aircraft weapon delivery. However, this application is certainly partially analogous to that of NPIC interest, the variables that affect image interpreter identification and recognition of targets encountered on
25X1 strategic photography. [redacted] is interested in constructing in the near future a realistic terrain model to be used outside in natural sunlight, an implementation which may be a solution to our problems encountered when trying to simulate scale and geometry as relevant to satellite photography. Continued close liaison is planned with [redacted] regarding the potential development of such a model. 25X1

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25X1 NPIC/TDS/DS [redacted] (10 May 67)